# INTERNATIONAL STANDARD 3150

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

# Radiators, convectors and similar appliances — Calculation of thermal output and presentation of results

*Radiateurs-convecteurs et appareils similaires — Calcul de la puissance thermique et présentation des résultats*

**First edition — 1975-07-01**



**UDC 697.358**

**Ref. No. ISO 3150-1975 (E)**

**Descriptors** : heaters, heat radiators, tests, computation, thermal output.



Price based on 2 pages

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3150 was drawn up by Technical Committee ISO/TC 116, *Space heating appliances,* and circulated to the Member Bodies in September 1973.

It has been approved by the Member Bodies of the following countries :

| | | |
|---|---|---|
| Australia | France | South Africa, Rep. of |
| Belgium | Germany | Thailand |
| Bulgaria | Ireland | Turkey |
| Canada | Italy | United Kingdom |
| Czechoslovakia | Netherlands | Yugoslavia |
| Denmark | Norway | |
| Egypt, Arab Rep. of | Romania | |

No Member Body expressed disapproval of the document.





Printed in Switzerland

# Radiators, convectors and similar appliances — Calculation of thermal output and presentation of results

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the method of calculating the thermal output of radiators, convectors and similar appliances and lists the particulars to be included in the test report.

It is applicable to tests carried out in accordance with ISO 3148, ISO 3149 and ISO . . .[1)]

## 2 REFERENCES

ISO 3147, *Heat exchangers — Verification of thermal balance of water-fed or steam-fed primary circuits — Principles and test requirements.*

ISO 3148, *Radiators, convectors and similar appliances — Determination of thermal output — Test method using air-cooled closed booth.*

ISO 3149, *Radiators, convectors and similar appliances — Determination of thermal output — Test method using liquid-cooled closed booth.*

ISO . . ., *Radiators, convectors and similar appliances — Determination of thermal output — Test method using open booth.*[1)]

## 3 CALCULATION OF THERMAL OUTPUT

The mean values obtained in the tests (see 4.5.1 and 4.5.2 of ISO 3148, 4.4.1 and 4.4.2 of ISO 3149 and 5.4.1 and 5.4.2 of ISO . . .) shall be used to calculate the thermal output.

To relate the output calculated in this way to the reference pressure conditions, multiply by the correction factor

$$1 + \frac{\beta \, \Delta p}{p_0}$$

where

$\beta$ is a coefficient equal to 0,3 for radiators and 0,5 for convectors;

$\Delta p = p - p_0$

$p$ being the mean atmospheric pressure during test;

$p_0$ being the reference atmospheric pressure (101,3 kPa, or 1 013 mbar);

provided that this correction factor is at least 1,01.

When the thermal output is measured at three points in the same fluid (three water temperatures or three steam temperatures), it shall be expressed in the form

$$\phi = B \, (t_{mean} - t_a)^n = B \, (\Delta t)^n$$

where

$t_{mean}$ is the mean temperature of the primary fluid $= (t_e + t_s)/2$

$t_e$ being the entry temperature of the primary fluid;

$t_s$ being the exit temperature of the primary fluid;

$t_a$ is the reference temperature of the air;

coefficients $B$ and $n$ are obtained by the method of least squares from the values of $\log \phi$ as a function of $\log (t_{mean} - t_a) \equiv \log \Delta t$, taking into account a weighting factor as described in the annex.

If, with steam, there is only a single measured value, the output shall only be indicated for the point at which the measurement was made.

## 4 TEST REPORT

**4.1** Records of all the observations made at regular intervals throughout each test shall be kept in the laboratory files.

**4.2** Only the arithmetical means shall be included in the table in the report relating to the corresponding test.

**4.3** The test report shall include :

a) the precise reference of the test method

1) with regard to the primary circuit (see ISO 3147);

2) with regard to the test booth (dimensions);

1) In preparation.